



Mark Poesch and his students researching freshwater aquatic systems near Terwilliger Park in Edmonton, part of a citizen science project

# 'Citizen science' pushes research projects forward

Crowdsourcing methods and tools allow community volunteers to collect data and funnel information to university researchers

By **DAINA LAWRENCE**

**C**itizen science projects are designed to get everyday people involved in the world around them. But what if it could help students discover new interests, narrow down their focus in school, and – perhaps most importantly – set them apart in the university application process?

University professors believe this is exactly what they can do.

At their core, citizen science projects ask networks of non-scientific volunteers – also known as crowdsourcing – to examine scientific questions, collect information and create databases to help researchers make unusual and important discoveries that may be too challenging to accomplish alone.

"I work on a lot on endangered species – we call them species at risk – and they're very difficult to study because as you can imagine, they're rare and by definition, you're going to come across them infrequently," says Mark Poesch, a professor at the University of Alberta's department of renewable resources.

His citizen science project, the Report-a-Fish tool, allows people to upload to his website a photograph of a fish they've seen or caught. Dr. Poesch can then use this tool to create a more extensive database about what fish are located where and determine a more accurate picture of their quantities.

"It takes us a lot of effort to go out and understand where these species are, whether they're going up or down. By crowdsourcing, we can get a better sense of where these fish are in particular," he says.

Many of these projects are open to anyone, as the objective is to "break down the model of the ivory tower" and get the average observer involved, Poesch says. But students may get more

PHOTOGRAPHY BY RICHARD SIEMENS

out of the experience than they initially realize because it's this type of inquisitive, hands-on learning experience that allows these students to stand out in the competitive university application process.

"We want students to come in with some kind of on-the-ground knowledge and this is one opportunity for them to gain that knowledge," Poesch says.

Trekking through a swamp counting frogs or analyzing and identifying pictures of wildlife online may also open up new interests for high-school students unsure of their postsecondary educational direction. But it's best to start sussing out projects early.

"Once you hit university, there's lots of opportunities that come your way, but for a high-school student it is better to get in early," Poesch says. "It's a very competitive atmosphere now, and so anything they could put on their résumé that would demonstrate to researchers or academics that they are really involved will help them."

Jean Polfus wishes these types of projects were around when she was in her formative educational years. This University of Manitoba PhD candidate in the Natural Resources Institute is at the beginning stages of starting her own citizen science project – the Caribou Diversity Project – used to help identify physical variations in caribou across the globe. She is eager to get students of all ages and from all areas of the country involved and they don't need to have a scientific background – just an interest in educating those around them.

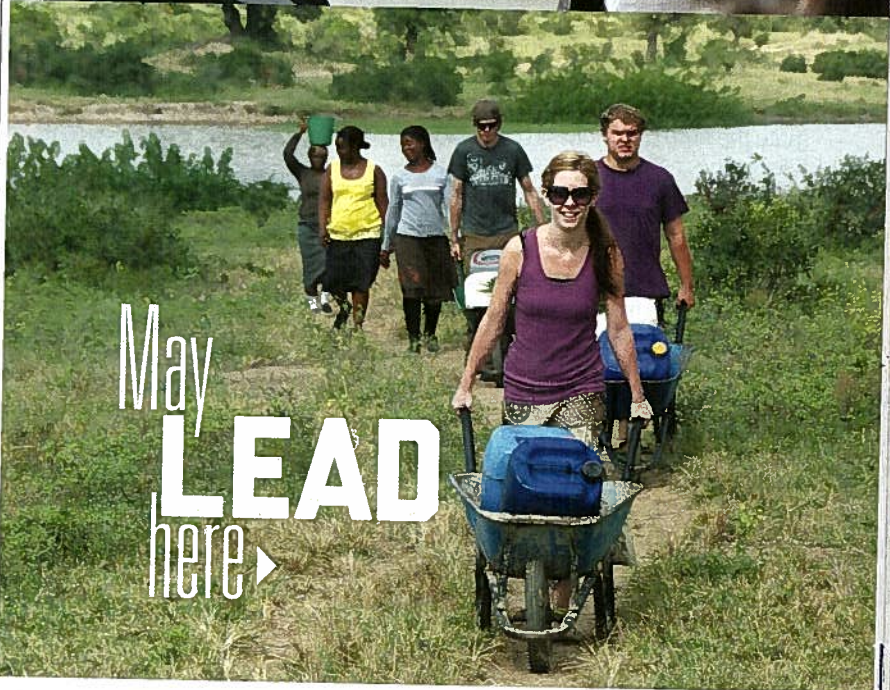
"Ideally, First Nations and Métis and Inuit people would be excellent to try and engage in this project," she explains, adding that these groups have a specific connection to the caribou



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as a food source. "But we're hoping that it could also be used as an educational tool for all Canadians and interested people across the world."

And if getting hands-on with nature isn't appealing, there are projects that can be done from the comfort of home. Rod Dobell, public policy professor at the University of Victoria, is involved with a project called Digital Fishers, a game that allows players to identify deep-sea life through YouTube videos, help-

ing researchers sift through the thousands of hours of footage they have gained.

With these at-home and in-the-classroom options, piquing a student's interest in science can be done at any age, Dr. Dobell explains, and it makes for more inquisitive students by the time they reach their postsecondary educational years.

"A science curriculum could be reformed in fascinating ways to give kids in elementary school a sense of how science is done. They're

starting right at the point of observing the raw imagery and making observations. They can follow that through the questions: 'How do we make sense of that? What is it we're seeing?'

"Later on, they start to get the sense of real science because nothing is coming as a ready-made hypothesis. ... In that sense, you get an experience of science that is very different from simply observing the instructor with a prestructured experiment in which everyone knows what's going to happen." ■

## Bats, spiders and dung beetles - all part of a night's job for students on rainforest expedition

At dusk, the students scurry into the rainforest. Under the thick forest canopy, the darkness is warm, sweet and damp. Droning insects and chirping bats quickly mute the hum of the diesel generator back at the makeshift camp.

They take unsteady steps along fallen trees and traverse muddy ground until they reach the tall and barely visible mist nets they've erected to catch bats. They find three in the first net, untangle them, and slip them into small canvas bags to carry back to the camp for identification.

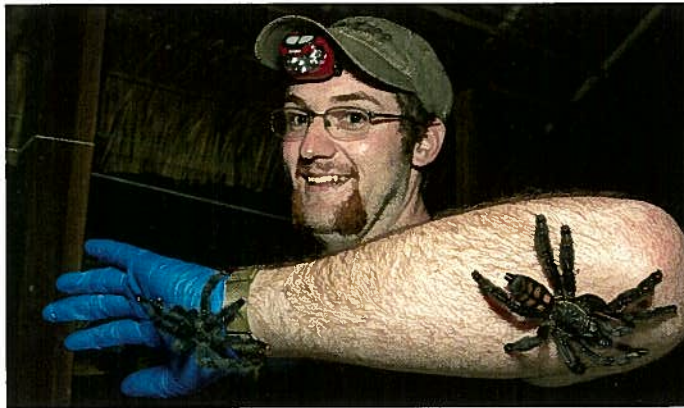
A few days earlier, these students were strangers. They travelled from Canada, the United States and Britain to volunteer as research assistants in Guyana for Operation Wallacea, an organization that runs biology and wildlife conservation research programs around the world.

Most of the students have never before handled wild animals - bats, birds, snakes and others - and few have experienced field research. Some are here to figure out whether they might enjoy careers as field biologists. Others hope to boost their chances of acceptance into a postgraduate program.

Burton Lim, a curator of mammals at the Royal Ontario Museum in Toronto and the expedition's resident bat expert, holds up a bat, *Artibeus gnomus*. It's a small fruit-eating bat, with a leaf-shaped nose and a yellow fringe along its ears. "I don't catch many of these," Dr. Lim says.

"Pretty awesome!" exclaims one student, who is now holding the bat.

For the next six hours - until midnight - the students check and recheck the nets. Most of the bats will be released back into the wild, but some will be kept as museum specimens. During the day, other teams will catalogue birds, reptiles, frogs, large mammals - and dung beetles.



Students get up close and personal with all kinds of creatures in the university fieldwork program

Prior to the expedition, Jin-Zhi (Gigi) Pao, 20, a biology student at Queen's University in Kingston, Ont., planned to apply to veterinary school. But this expedition has her reconsidering her future. "I was hoping for an authentic research experience, and I got it," she says. This fall, she will do a senior thesis in biology.

"The problem with many universities is that they have moved away from introducing students to fieldwork," says Tim Coles, the project director and founder of Operation Wallacea, based in Lincolnshire, England. "If you're interested in ecology, it's good to get into the field to know if you want to move onto a master's."

Unusual volunteer experiences can also boost résumés. Students applying to medical and veterinary schools need to distinguish themselves from their peers. "This is clearly one of those things that can make them stand out from the rest," Dr. Coles says.

"Hands-on experience is good prep for the program," says Elizabeth Lowenger, manager of student affairs at the Ontario Veterinary College at the University of Guelph.

In 2013, more than 2,000 high-school

and university students joined Operation Wallacea expeditions in 12 countries, including Honduras, Indonesia and Egypt. Undergraduates can also use the experience to gather data for dissertations or course credit.

Volunteers pay to take part in the research. The price varies according to the duration of the expedition, which can range from two to eight weeks. A four-week long trip to Guyana, for example, costs \$3,200, not including the round-trip air fare to Georgetown. The fee covers all food, accommodation and medical and evacuation insurance.

For Jocelyn Leger, 20, a biochemistry major at Mount Allison University in Sackville, N.B., the expedition allowed her to stretch her limits. As she walked through the rainforest one night, she saw "thousands of twinkling diamonds," she says. "But they were spider eyes!" Once terrified of spiders, Ms. Leger overcame her uneasiness to the point that she could identify them.

"I felt like I could do anything when I came back from Guyana," she says. "You will be pushing your boundaries, but it's a worthwhile experience."

- Hannah Hoag